

## CLAIMS

- 1 1. A seedbed preparation implement comprising:
  - 2 (A) a cultivator including
    - 3 (1) a mainframe configured to be pulled in a draft direction, and
    - 4 (2) a plurality of ground engaging plow shanks mounted on said
    - 5 mainframe; and
  - 6 (B) a disc harrow including at least one disc gang, said disc gang including
    - 7 (1) a disc support beam,
    - 8 (2) a plurality of ground engaging discs which are rotatably supported
    - 9 on said disc support beam and which are configured to rotate about a common
    - 10 axis that extends at a disc gang angle relative to a perpendicular to said draft
    - 11 direction,
  - 12 (3) a main beam to which said disc support beam is attached and
  - 13 which is mounted on said mainframe so as to permit said disc gang to be movable
  - 14 relative to said mainframe as a unit so as to adjust said gang angle.
- 1 2. The seedbed preparation implement as recited in claim 1, wherein said gang angle
- 2 is infinitely adjustable within at least a designated range.
- 1 3. The seedbed preparation implement as recited in claim 2, wherein said designated
- 2 range extends from about 5° to about 10°.

1 4. The seedbed preparation implement as recited in claim 1, wherein said main beam  
2 is pivotably mounted on said mainframe adjacent a first end thereof and is mounted on a  
3 support at a location remote from said first end so as to permit said main beam to slide  
4 along an unsegmented guide on said support during gang angle adjustment.

1 5. The seedbed preparation implement as recited in claim 1, further comprising an  
2 actuator that is coupled to said disc gang and to said mainframe and that is operable to  
3 pivot said disc gang about said mainframe to effect gang angle adjustment.

1 6. The seedbed preparation implement as recited in claim 5, wherein said actuator  
2 comprises a turnbuckle.

1 7. The seedbed preparation implement as recited in claim 1, further comprising  
2 support arms which couple said main beam to said disc support beam, said support arms  
3 being pivotable to raise and lower said disc support beam relative to said main beam and,  
4 thereby, adjust a cutting depth of said discs.

1 8. The seedbed preparation implement as recited in claim 1, wherein said main beam  
2 is mounted on a front end of said mainframe and said disc support beam is disposed in  
3 front of said main beam.

1 9. The seedbed preparation implement as recited in claim 8, further comprising a  
2 harrow that is towed behind said cultivator.

1 10. The seedbed preparation implement as recited in claim 1, wherein two sets of disc  
2 gangs are provided on opposite sides of a line that laterally bisects said seedbed  
3 preparation implement, each disc gang set being formed from at least two disc gangs that  
4 have independently adjustable gang angles.

1 11. A seedbed preparation implement comprising:

2 (A) a generally rectangular mainframe configured to be pulled in a draft  
3 direction;

4 (B) a plurality of plow shanks extending downwardly from said mainframe;  
5 and

6 (C) at least two modular disc gangs mounted in front of said mainframe as a  
7 unit, each of said disc gangs including

8 (1) a disc support beam located in front of said mainframe and  
9 extending at a gang angle relative to a perpendicular to said draft direction,

10 (2) a plurality of ground engaging rotary discs rotatably supported on  
11 said disc support beam,

12 (3) a main beam which extends in parallel with said disc support beam  
13 and which is disposed between said disc support beam and said mainframe, said  
14 main beam being a) attached to said disc support beam so as to maintain said  
15 parallel relationship therebetween and b) mounted on said mainframe so as to  
16 permit said disc gang to be movable relative to said mainframe so as to permit  
17 infinite adjustment of said gang angle within at least a range extending from about  
18 5° to 10°, and

19                   (4)     an actuator which is coupled to said disc gang and to said  
20                   mainframe and which is operable to move said disc gang relative to said  
21                   mainframe to effect gang angle adjustment.

1     12.     The seedbed preparation implement as recited in claim 11, wherein said main  
2     beam is pivotably mounted on said mainframe adjacent a first end thereof and is mounted  
3     on a slotted plate at a location remote from said first end so as to permit said main beam  
4     to slide along a slot in said slotted plate for gang angle adjustment.

1     13.     The seedbed preparation implement as recited in claim 11, wherein said actuator  
2     comprises a turnbuckle.

1     14.     The seedbed preparation implement as recited in claim 11, further comprising  
2     support arms which couple said main beam to said disc support beam, said support arms  
3     being pivotable to permit said disc support beam to be raised and lowered relative to said  
4     main beam to adjust a cutting depth of said discs.

1     15.     The seedbed preparation implement as recited in claim 11, wherein two sets of  
2     disc gangs are provided on opposite sides of a line that laterally bisects said mainframe,  
3     each disc gang set being formed from at least two disc gangs whose gang angles are  
4     independently adjustable.

1 16. A disc gang assembly configured for attachment to a mainframe of a seedbed  
2 preparation implement that is configured to be pulled in a draft direction, said disc gang  
3 assembly comprising:  
4 (A) a frame which is configured to be connectable to the main frame; and  
5 (B) a plurality of ground engaging rotary discs which are supported on said  
6 frame and which are configured to rotate about an axis that extends at a gang angle  
7 relative to a perpendicular to said draft direction, wherein said frame includes hardware  
8 configured to connect said frame relative to the implement mainframe so as to permit said  
9 frame be movable relative to the mainframe so as to permit said gang angle to be  
10 infinitely adjusted through a range of at least 3 °.

1 17. The disc gang assembly as recited in claim 16, wherein said range extends from  
2 about 5° to about 10°.

1 18. The disc gang assembly as recited in claim 16, wherein said frame is pivotably  
2 mountable on the mainframe adjacent a first end of said frame and is mountable on a  
3 slotted support of the mainframe at a location remote from said first end so as to permit a  
4 pin depending from said frame to slide along a slot in said slotted support for disc gang  
5 angle adjustment.

1 19. The disc gang assembly as recited in claim 16, wherein said frame comprises a  
2 main beam which is mountable on the mainframe and a disc support beam which is

3 located in front of said main beam, which is connected to said main beam by a plurality  
4 of support arms, and which supports said discs.

1 20. The disc gang assembly as recited in claim 19, wherein said support arms are  
2 pivotable to raise and lower said disc support beam relative to said main beam and,  
3 thereby, adjust a cutting depth of said discs.

1 21. The disc gang assembly as recited in claim 16, further comprising an actuator that  
2 is coupled to said disc gang, that is configured to be coupled to the frame, and that is  
3 operable to move said disc gang relative to the mainframe to effect gang angle  
4 adjustment.

1 22. A method of tilling soil comprising:

2 (A) pulling a seedbed preparation implement in a draft direction;

3 (B) during the step (A), plowing the soil using a plurality of plow shanks  
4 mounted on a mainframe of said seedbed preparation implement;

5 (C) during the step (A), cutting and turning the soil using a plurality of  
6 rotating discs of a disc gang, said discs rotating about a common axis that extends at a  
7 gang angle relative to a perpendicular to said draft direction, and

8 (D) adjusting said gang angle by moving said disc gang relative to said  
9 mainframe, the adjustment being infinite through a designated range of at least 3°.

- 1 23. The method as recited in claim 22, wherein the disc gang angle is infinitely  
2 adjustable within at least a range extending from about 5° to about 10°.
- 1 24. The method of as recited in claim 22, wherein the adjusting step comprises  
2 pivoting one end portion of a main beam of said disc gang about a vertical axis while  
3 permitting a pin extending from another portion of said main beam to slide within an  
4 elongated slot on said mainframe.
- 1 25. The method as recited in claim 22, wherein the adjusting step comprises actuating  
2 an actuator extending between said main beam and said mainframe.
- 1 26. The method as recited in claim 24, wherein said discs are mounted on a disc  
2 support beam that is connected to said main beam and that moves with said main beam  
3 during gang angle adjustment, and further comprising raising and lowering said disc  
4 support beam relative to said main beam to adjust a cutting depth of said discs.
- 1 27. A method of tilling soil, comprising:  
2 (A) pulling a seedbed preparation implement in a draft direction;  
3 (B) during the step (A), plowing the soil using a plurality of plow shanks  
4 mounted on a mainframe of said seedbed preparation implement;  
5 (C) during the step (A), cutting and turning the soil using a plurality of  
6 rotating discs of a disc gang, said disc gang including a main beam that is coupled to a  
7 front portion of said mainframe, and a disc support beam that is located in front of said

8 main beam, that is coupled to said main beam so as to move therewith, and that supports  
9 said discs so as to permit said discs to rotate about a common axis that extends at a gang  
10 angle relative to a perpendicular to said draft direction; and

11 (D) adjusting said gang angle by actuating an actuator so as to pivot said main  
12 beam about a vertical axis and thereby to cause a pin coupled to said main beam to slide  
13 along an unsegmented guide in a plate attached to said frame.

1 28. The method as recited in claim 27, further comprising raising and lowering said  
2 disc support beam relative to said main beam to adjust a cutting depth of said discs.